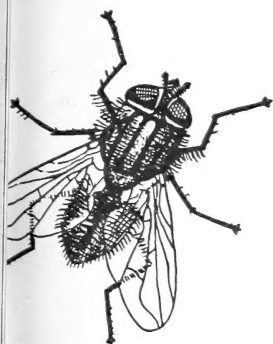


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HOUSEFLY *CONTROL*



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OF AGRICULTURE

HOUSEFLY CONTROL

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The housefly, known scientifically as *Musca domestica* L. (fig. 1), is annoying to man and animals and carries several important diseases and parasites, such as typhoid, tuberculosis, dysentery, and intestinal worms. It is closely associated with man and has a wide distribution. This fly breeds in excrement and feeds upon it and other filth as well as upon foods consumed by man. In this way it carries germs of all sorts on its hairy legs and feet. Germs live for some time in the digestive tract of the fly and may be dropped on food or utensils in its excrement or in the material discharged from its mouth.

Life History and Habits

The housefly lays its white eggs in masses in the cracks in manure and fermenting vegetable matter. It prefers comparatively fresh horse manure, but it also breeds freely in the moist excrement of hogs, chickens, and man. Garbage, fermenting farm wastes, and cattle manure, especially if mixed with straw, are also favorable for its development.

The eggs usually hatch in from 10 to 24 hours. The resulting larvae, or maggots, under favorable conditions complete their growth in from 3 to 7 days. The larvae are then creamy white and about half an inch long (fig. 2). These maggots crawl to the edges of the manure pile, where they may burrow into the surface of the soil or seek other favorable places in which to change to flies. This change takes place in what is known as the pupa, or resting stage. The pupa is inactive, yellowish to dark brown, depending on its age, and barrel-shaped, as shown in figure 3. In warm weather the pupal stage lasts from 3 to 6 days, and during cold weather it may last many weeks.

When transformation is complete the adult fly pushes open the end of the pupal case, works its way to the surface, spreads its wings, and is soon ready to start on its career of annoyer and disease bearer. The female mates and is ready to lay eggs in from $2\frac{1}{2}$ to 20 days after emergence. From 2 to 21 egg masses, each containing about 130 eggs, may be deposited by 1 female during a normal lifetime of from 2 to 12 weeks.

Methods of Controlling the Housefly

There are a number of ways in which the housefly problem may be attacked. Usually several of these must be employed to control the pest effectually.

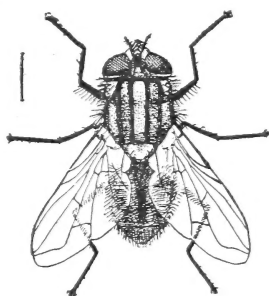


FIGURE 1.—The true housefly. About three times natural size.

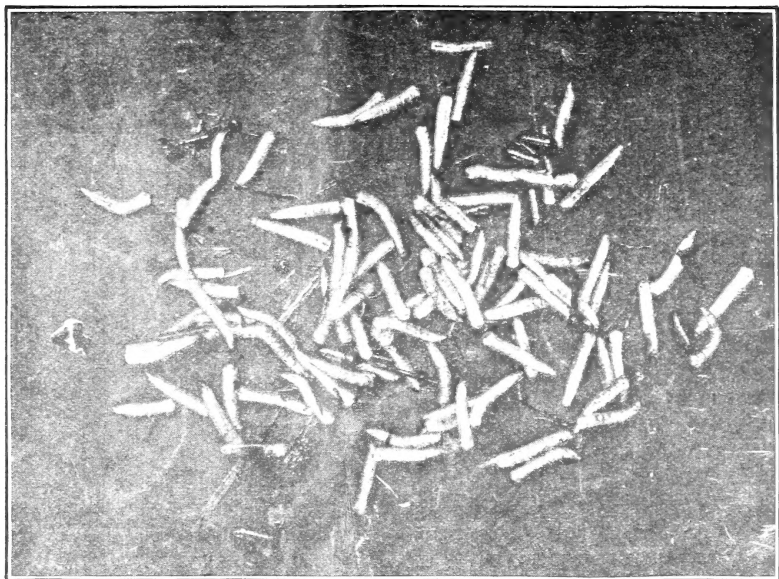


FIGURE 2.—Larvae, or maggots, of the housefly. About natural size. (Newstead.)

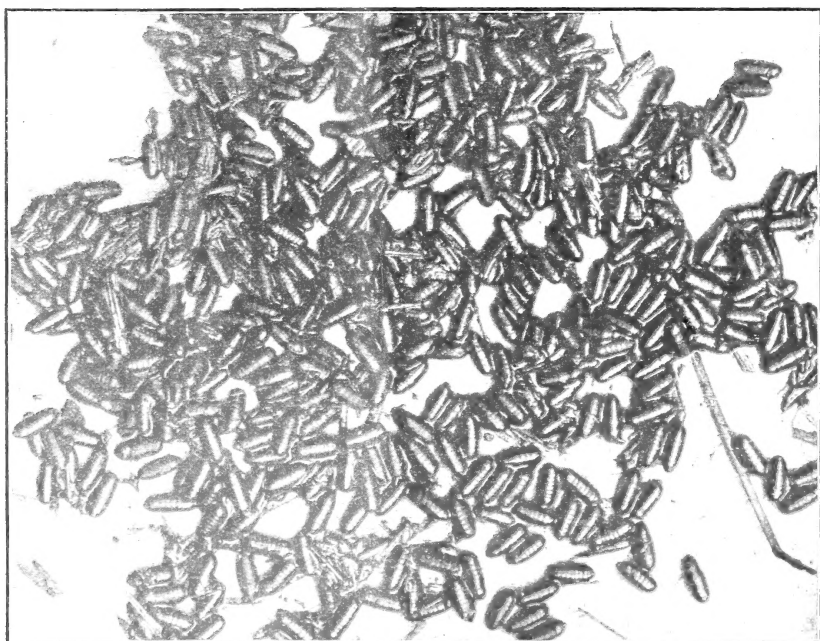


FIGURE 3.—Pupae of the housefly. About natural size. (Newstead.)

Prevention of Fly Breeding in Manure

The prevention of fly breeding is the most important single element in housefly control. From the methods of preventing fly breeding outlined below, those should be chosen which best fit local conditions and needs.

Scattering manure on fields.—The daily removal of manure and other farm waste and the scattering of it on fields are urged wherever practical. A manure spreader helps in doing this. The material should be spread rather thinly so that any fly eggs or young maggots present will be killed by heat, cold, or drying.

Storage of manure in boxes or pits.—Where it is impractical to scatter manure regularly, boxes or pits may be used for storage (fig. 4). Such structures should be fly-tight, preferably they should be made of

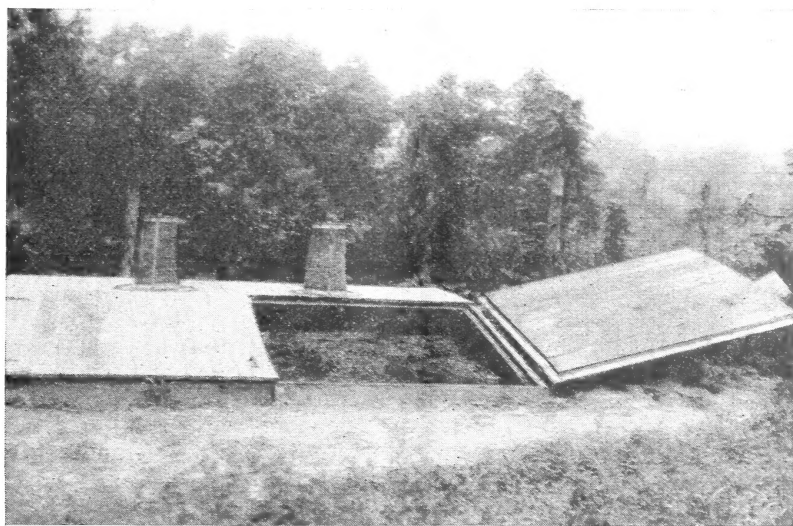


FIGURE 4.—A good pit for storing manure to prevent fly breeding.

concrete, and the doors should be kept closed except while manure is being put in or removed. The manure should be put into the container promptly so as to reduce fly infestation as much as possible. However, since some infestation is sure to take place, one or more conical or tent-shaped fly traps should be installed on the top of the pit to catch the flies that emerge in the pit.

Compact ricking of manure.—Where large quantities of manure must be stored, fly breeding can be largely prevented by piling it in compact rectangular ricks. The manure should be compacted as much as possible. This can be done by driving along the top of the rick with the loads of manure as they are dumped. The ricks are thus formed slightly wider than the wagon, from 3 to 5 feet high, and as long as is necessary to include all the manure. The sides of the ricks should be made as nearly vertical as possible and should be pounded down with a shovel. The heat generated in the manure destroys many of the maggots and drives the rest to the surface, where they may be killed by applying borax (p. 4) or by sprinkling the edges of the pile

and adjacent soil heavily with used crankcase oil or, better, with crude petroleum. The ground where the manure is stored may be covered with concrete and troughs or ditches provided along the sides of the pile. These ditches, into which many of the maggots will drop, may be supplied with waste crankcase oil or crude petroleum to kill the maggots.

Chemical treatment of manure.—Fly breeding in manure can be largely prevented by applying to it a water suspension of powdered hellebore or a solution of powdered borax, which will kill the eggs and maggots.

Hellebore is a plant material used against various insects. It is not injurious to the manure, and, although it is slightly poisonous, its presence on the manure does not constitute a danger to livestock or poultry. For each 8 bushels of manure, one-half pound of fresh hellebore is stirred into 10 gallons of water; after standing 24 hours, it is sprinkled over the pile with a watering pot.

Borax is used at the rate of 11 ounces to each 8 bushels of manure. That amount of borax is dissolved in from 2 to 10 gallons of water and sprinkled on the manure. When manure thus treated is applied to land at the rate of 15 tons per acre, as a rule no injury to crops will result. Heavier applications are likely to injure some crops on certain soil types. Care must therefore be exercised not to apply more than the amount indicated. In fact, if manure is being accumulated rapidly, it can be piled compactly and only the surface layer of the pile treated, as the fly breeding is confined to that part. This makes it possible to reduce considerably the proportion of borax to the entire pile.

Calcium cyanamid and superphosphate,¹ when added to manure at the rate of one-half pound of each to the bushel of manure, have been found to give almost complete control of fly breeding. These materials are scattered dry over the pile, then water is applied. The use of this mixture adds two important fertilizing elements to the manure, namely, nitrogen and phosphorus.

Construction and Care of Stables

Stable floors of concrete are desirable from the standpoint of fly control; these as well as all other types of floors, however, must be thoroughly cleaned at frequent intervals. Dirt floors should be packed hard and the loosened manure-soaked surface removed occasionally. Plank floors should be as tight as possible, and a small amount of borax should be scattered along the cracks every 2 weeks. Flies often breed in accumulations of material in the corners of feed boxes and mangers. Such places should be kept clean.

Sewage and Garbage Disposal

On account of the danger of typhoid fever and other intestinal diseases, the proper disposal of human excreta is of great importance. In larger towns and cities an adequate sanitary sewage system is generally provided, and all the houses should be connected with it. In smaller towns and rural communities sanitary privies, from which flies are excluded, are a necessity. Methods of constructing such privies and modern farm sewage-disposal systems are described in

¹ Formerly termed "acid phosphate."

Farmers' Bulletin 1227, Sewage and Sewerage of Farm Homes. Until open-box privies can be replaced, fly breeding in them should be prevented by scattering enough borax over the excreta every 3 or 4 days to make it white.

Excluding and Destroying Flies

Despite every effort to prevent fly breeding, some flies will be produced, especially under farm conditions. This makes it necessary to take action against the flies themselves by destroying them and by protecting man and his food from them. For these purposes screens, traps, sprays, poisons, and swatters are useful.

Insect screens.—The value of screens in excluding flies is known to all. Foods in public places as well as those in the home should be protected. Screens should be well fitted, and screen doors should be made to open outward. In humid climates screens of copper, bronze, or one of the corrosion-resisting alloys are advised, while in dry regions galvanized or painted ones are satisfactory. Screens of 14 meshes to the linear inch will exclude the housefly, but 16-mesh wire is advised, as other insects must be excluded also.

Fly traps.—Large numbers of houseflies can be captured in traps of proper construction if set in favorable places and suitably baited.

The conical-type trap is most effective (fig. 5).² Traps from 12 to 18 inches in diameter, with the sides and top built of screen, and with a cone reaching nearly to the top, are recommended. The legs of the trap should be about 1 inch long. The frame of the trap may be made of barrel hoops and laths, as shown in figure 5, or of metal.

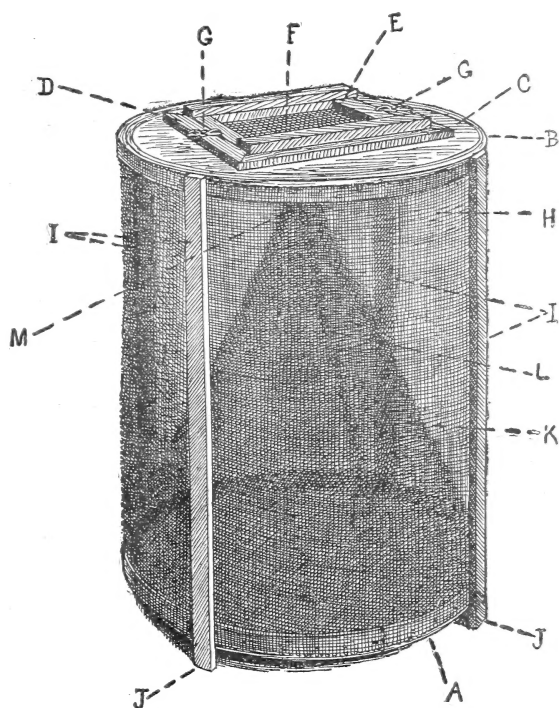


FIGURE 5.—Conical hoop flytrap, side view: A, Hoops forming frame at bottom; B, hoops forming frame at top; C, top of trap made of barrel head; D, strips around door; E, doorframe; F, screen on door; G, buttons holding door; H, screen on outside of trap; I, strips on side of trap between hoops; J, tips of these strips projecting to form legs; K, cone; L, united edges of screen forming cone; M, aperture at apex of cone.

² More details regarding the construction and operation of traps are given in Farmers' Bulletin 734, Flytraps and Their Operation.

The bait should be placed beneath the trap in a broad, shallow pan, about 4 inches less in diameter than the base of the cone and 1 inch deep.

Any substance attractive to the housefly may be used as bait. Blackstrap molasses, 1 part, and water, 3 parts, make a convenient and attractive bait. Milk and fruit waste may also be employed.

The traps should be set where flies naturally congregate. This is usually on the sunny side of a building (except in very hot weather), and out of the wind. The bait pan should be kept well filled and should be washed out occasionally. The catch is reduced when the flies become piled more than a fourth of the way up the cone. At such times the trap should be emptied. The live flies in the trap at the time of emptying may be killed by immersing the trap in hot water or by the use of a fly spray. The number of traps required depends on the size of the premises and the abundance of flies; on a city lot 1 trap is usually sufficient, while on a farm from 3 to 10 traps may be profitably operated.

Electrocuting devices have been developed that are effective in destroying flies. Although such devices cost much more than conical traps, they require somewhat less attention.

Fly sprays.—Where flies congregate in barns or around houses or gain entrance to houses and public buildings in considerable numbers, fly sprays may be used to advantage. Pyrethrum extract in a high-grade kerosene (greaseless) applied with a good hand or electric spray gun is very effective in killing houseflies. Each gallon of kerosene should contain the extract of 1 pound of pyrethrum flowers testing 0.9 percent of pyrethrins. If the pyrethrum flowers are of a lower grade, a proportionately larger quantity should be used. Out of doors the flies must be struck with the spray. Indoors the spray should be atomized into the air until there is a good floating mist. The room should then be closed for half an hour, to secure the best results. Many of the commercial fly sprays now on the market are essentially of this composition. Pyrethrum concentrates may also be purchased and appropriately diluted with refined kerosene. These are usually designated as 1 to 5, 1 to 20, and 1 to 40, that is, 1 gallon of the concentrate contains the extract of 5, 20, or 40 pounds of pyrethrum.

Flypaper, fly poisons, and fly swatters.—Flypapers, fly poisons, and swatters are useful in destroying occasional flies that gain entrance to homes or food-handling establishments. The safest and most effective poison consists of 3 teaspoonfuls of commercial formalin to 1 pint of milk or water with a little brown sugar added. A convenient way of exposing this is to partly fill a drinking glass with the solution. A small plate or saucer is then lined with a piece of blotting paper and placed on the glass, bottom up. The whole is then inverted, and a piece of matchstick inserted under the edge of the glass.

